The solution to the above indicated minimization problem reads

$$\begin{pmatrix} c_0 \\ c_1 \\ \vdots \\ c_{R-1} \end{pmatrix} = \begin{pmatrix} A_{0,0} & A_{0,1} & \cdots & A_{0,R-1} \\ A_{1,0} & A_{1,1} & \cdots & A_{1,R-1} \\ \vdots & \vdots & \ddots & \vdots \\ A_{R-1,0} & A_{R-1,1} & \cdots & A_{R-1,R-1} \end{pmatrix}^{-1} \cdot \begin{pmatrix} B_0 \\ B_1 \\ \vdots \\ B_{R-1} \end{pmatrix} \qquad (44)$$

with

$$A_{m,n} = H^t \sum_{l=1}^{Q} W_l \Theta_{m,n}(\theta_{l_1}, \theta_{l_2}) H \quad \text{und} \quad B_m = H^t \Theta_{m,0}(\theta_{l_1}, \theta_{l_2}) \, . \qquad (45)$$

The compensation pulse can be calculated with (36) and (38).

Fig. 19 illustrates the nominal transmission function as well as compensation pulses of various length for a system with $M = 16$ and $P = 2$. In this example, the fade-out range was selected to range from $0.25 \leq \theta/\pi < 0.625$. The compensation pulses are devised for the band $0.375 \leq \theta/\pi < 0.5$. The quality factors outside the fade-out range are selected to be very low, this being the reason for the excesses. The compensation pulse of the length 34 has considerably improved properties over the compensation pulse of the length 16.

The fade-out range is assumed to be the range $k\frac{2\pi}{M} \leq \theta < (k+1)\frac{2\pi}{M}$, the compensation filter calculated therefor, $S(e^{j\theta})$. If the information symbol A_l is transmitted in the channel l, said symbol acts on the channel (the prefactor $\frac{1}{\sqrt{M}}$ comes in the IDFT because of $\frac{1}{M}$) with the transmission function $N_l(e^{j\theta}) = \frac{1}{\sqrt{M}}H_l(e^{j\theta})$. The spectrum at the output of the compensation filter $S(e^{j\theta})$ is to coincide as far as possible with $N_l(e^{j\theta})$ within the fade-out range.

$$K_l S(e^{j\theta}) \approx A_l N_l(e^{j\theta}) \quad \text{for } k\frac{2\pi}{M} \leq \theta < (k+1)\frac{2\pi}{M} \tag{46}$$

The factor K_l is the excitation of the filter $G(e^{j\theta})$ with which $S(e^{j\theta})$ is approximated. Total coincidence is not possible within the overall fade-out range. This is the reason why the above equation is to be exactly satisfied with an equal sign for the frequency $(k+\frac{1}{2})\frac{2\pi}{M}$.

$$K_l S(e^{j\theta})\Big|_{\theta=(k+\frac{1}{2})\frac{2\pi}{M}} = A_l N_l(e^{j\theta})\Big|_{\theta=(k+\frac{1}{2})\frac{2\pi}{M}} \tag{47}$$

Evaluated at $\theta = (k+\frac{1}{2})\frac{2\pi}{M}$, the transmission functions yield

$$N_l(e^{j\theta})\Big|_{\theta=(k+\frac{1}{2})\frac{2\pi}{M}} = \frac{(-1)^{k-l}}{M\sin\left(\frac{\pi}{M}(k-l+\frac{1}{2})\right)}\, e^{j\pi(k-l+\frac{1}{2})(-1+\frac{1}{M})} \quad \text{or} \qquad (48)$$

$$S(e^{j\theta})\Big|_{\theta=(k+\frac{1}{2})\frac{2\pi}{M}} = \frac{1}{\sqrt{M}\sin\frac{3\pi}{2M}}, \qquad \text{resp.} \quad (49)$$

accordingly, the excitation of the filter $G(e^{j\theta})$ is

$$K_l = A_l \frac{N_l(e^{j\theta})}{S(e^{j\theta})}\Big|_{\theta=(k+\frac{1}{2})\frac{2\pi}{M}} = A_l \frac{\sin\frac{3\pi}{2M}}{\sqrt{M}\sin\left(\frac{\pi}{M}(k-l+\frac{1}{2})\right)}\, e^{j\pi(k-l+\frac{1}{2})(-1+\frac{1}{M})}(-1)^{k-l}. \qquad (50)$$

Crosstalk that is occasioned by the information symbol A_l of the channel l in the fade-out range is compensated with this excitation. Each charged channel generates an interference in the fade-out range through the side lobes of its transmission function. The indices of all the charged subcarriers be combined in the quantity K. In order to compensate crosstalk of all the charged subcarriers in the range $k\frac{2\pi}{M} \leq \theta < (k+1)\frac{2\pi}{M}$, the filter $G(e^{j\theta})$ must be excited with